

Reading

Most inventions develop in unexpected ways. Read this article about the evolution of the modern pencil, and then answer the questions that follow.



Beyond the Pencil

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Shortly after the first pencil was put to paper, the first mistake was made. But it would be a long time before erasers as we know them were invented, and even longer before an easy way to sharpen that pencil came about.

The Pencil

2 The history of the pencil dates back to 1564, when an uprooted tree in England revealed a hard, black substance, which we know today as graphite. From this, the first primitive pencils were made.

Pencil technology made a great leap forward in 1795, when French chemist Nicolas Conte patented a process that used a mixture of clay and graphite. The mixture was fired in a kiln before it was put into a wooden case. This process allowed pencils to be made to any hardness or softness, which was important to artists and designers. It was also the prototype for the pencils we use today.

Whoops!

But what to do about those pesky mistakes? For nearly 200 years after the first pencils were used, people used little rolled-up balls of bread to rub out their errors. Bread had its limits, though, some of which you can probably imagine for yourself. First, bread rots. Second, bread wears out quickly. Third, bread erasers left smears and smudges behind. Fourth, you can't eat bread once you've got graphite all over it!

Clearly, something had to be done. Charles Marie de la Condamine, a French scientist and explorer, was the first to bring a substance called "India rubber" back to Europe from his travels. The name is misleading, though, because India rubber came from South America, where people

used it to make balls and as an adhesive for attaching decorative items to their bodies.

English inventor and scientist Joseph Priestly is credited with figuring out that this substance could be used to erase pencil marks on sheets of paper. This occurred around 1770. But, like food, rubber rotted. In 1839, Charles Goodyear discovered a way to cure rubber and make it a lasting and useable material. This process was called vulcanization. In 1844, Goodyear patented his process. With this improvement, erasers came into everyday use.

Still, problems existed. You could never find an eraser right when you needed it! A Philadelphia inventor by the name of Hyman Lipman came up with the idea of putting an eraser where it belonged—on the end of a pencil. In 1858 he was issued a patent for this idea, though it was later revoked because his "invention" was really just a combination of two existing ideas.

Where's the Point?

The average pencil can write 45,000 words or draw a line 35 miles long—but not without pausing for a good sharpening every now and then. For years and years, people had to use knives to whittle away the wood on their pencil and make a fine, sharp point. By the time you got the pencil ready, you might have forgotten what you wanted to write!

There is some dispute over who should get credit for the invention of the pencil sharpener. Bernard Lassimone of France applied for a patent on an invention to sharpen pencils in 1828. In 1847, Therry des Estwaux invented the manual pencil sharpener that was the predecessor of those we use today.

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The undisputed holder of the U.S. patent for the pencil sharpener was John Lee Love, an African American inventor from Massachusetts. The “Love Sharpener” was the very simple, portable pencil sharpener that many artists use today. With this sharpener, the pencil is put into the opening of the sharpener and rotated by hand,

and the shavings stay inside. Love’s sharpener was patented on November 23, 1897.

Granted, the pencil is not as complex as the word processor, but behind that familiar yellow paint and pink top lies a great deal of history, brain power, and inventiveness. Pretty sharp!

Choose the best answer for each question. Mark your answer choices for multiple-choice questions 11 through 15 in the spaces provided on side 1 of your answer sheet.

ID:177607 Key: A Montana Standard 5

11. The **main** purpose of the first paragraph is to
- A. introduce the topic of the article.
 - B. give a brief history of the pencil.
 - C. detail important ideas in the article.
 - D. explain how the eraser was invented.

ID:177608 Key: C Montana Standard 2

12. In paragraph 2, the word primitive means
- A. hard.
 - B. sharp.
 - C. simple.
 - D. useful.

ID:177609 Key: C Montana Standard 1

13. How did the discovery of the vulcanization process improve erasers?
- A. It allowed rubber to be used to erase pencil marks.
 - B. Rubber erasers were easier to attach to pencils.
 - C. It prevented rubber erasers from rotting.
 - D. Rubber could more easily be formed into erasers.

ID:177610 Key: B Montana Standard 1

14. Which idea **best** summarizes the information in this article?
- A. A single invention can change the world.
 - B. New discoveries can improve an invention.
 - C. Scientists work on the same projects for a long time.
 - D. Inventors and scientists compete with one another.

ID:177611 Key: D Montana Standard 4

15. Which source would probably provide the **most** information about applying for a patent?
- A. a book titled *How to Win a Patent Fight in a Courtroom*
 - B. an article about recent patents in *Inventors* magazine
 - C. an encyclopedia entry for patents, trademarks, and copyrights
 - D. a Web site sponsored by the United States Patent Office